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ABSTRACT

This teacher's guide presents a course for training hearing-impaired students to listen to, create, and perform music. It emphasizes development of individual skills and group participation, encouraging students to contribute a wide variety of auditory and musical abilities and experiences while developing auditory acuity and attention. A variety of instructional aids are described for those who may experience difficulty discriminating some parameters of sound or music (e.g., amplification systems, a "vibrating floor," color organs, oscilloscopes, real-time spectrum analyzers, tuning forks, metronomes, and drum machines). Seven learning objectives are presented: (1) identify ways to use music as a form of communication and expression; (2) identify basic elements of sound and sound production; (3) describe the process of translating sound elements into music elements of pitch, loudness, rhythm, and timbre; (4) read basic musical notation, including all notes on the grand staff, rhythm markings, and dynamic markings; (5) play a simple musical composition on an instrument, reading it from musical notation; (6) contribute to creating a class musical composition; and (7) participate in performing the class musical composition. Sample listening activities are described and equipment sources listed. (VW)

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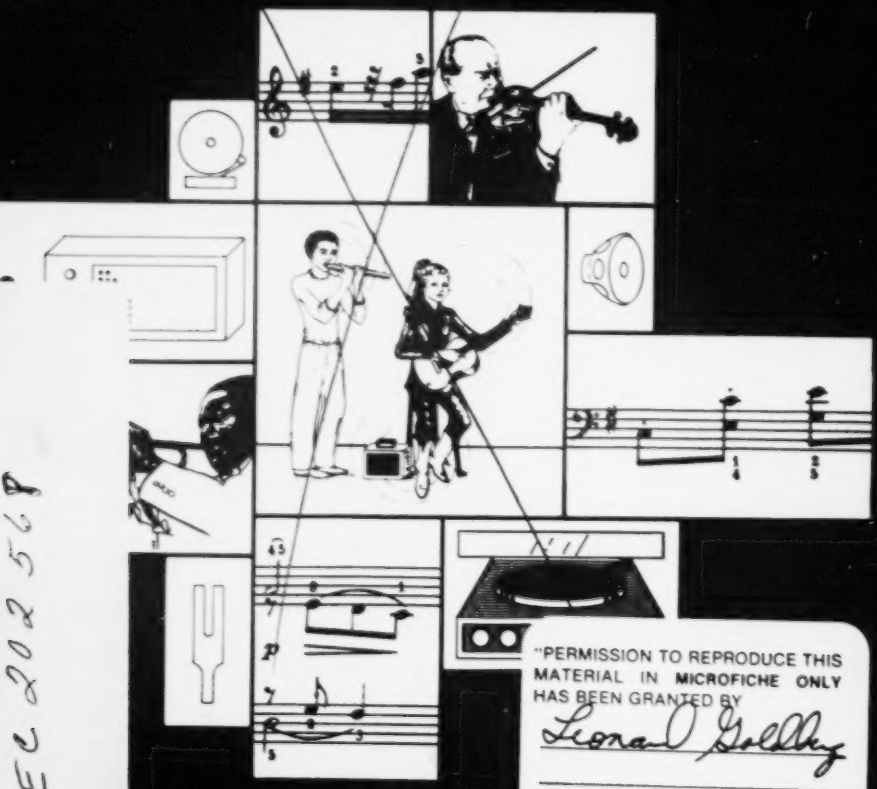

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Teacher Guide

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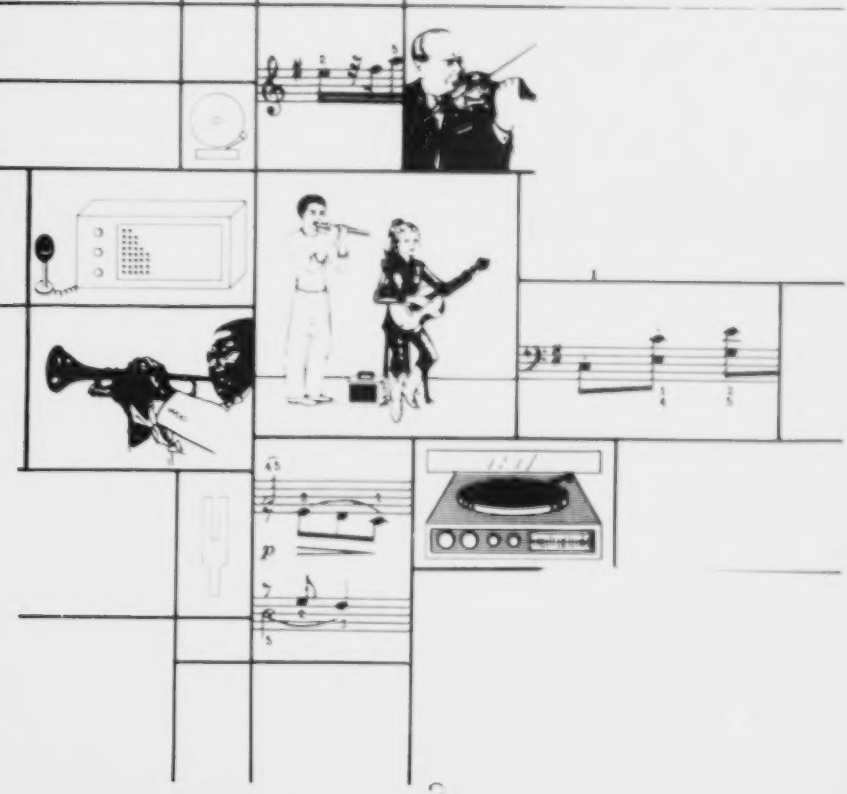

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MUSIC AND YOU

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INTRODUCING MUSIC

Music is universally recognized as a basic form of inspiration and creative expression. There is no reason why people with hearing impairments should be excluded from the possibility of enjoying and expressing themselves through music. This course, *Music and You*, is designed to train hearing impaired students to listen to, create and perform music. Although one goal of the course is to help students develop auditory acuity and attention, the use of visual and tactual aids is equally important, making new concepts of sound and music available to all students.

Any student who shows interest in music should be encouraged to enroll. That includes students with any type or degree of hearing loss, whether or not they derive benefit from amplification. Students who can use hearing aids should be encouraged to do so. The only prerequisite is an introductory communications course, and the ideal class would include from four to eight students. The course should require five classes per week for a period of 18 weeks, culminating in the creation and performance of an original musical composition.

For many hearing impaired students, music is an effective motivator for developing attention and listening skills. Arthur Boothroyd calls musicality "...the ability to retain, recognize, and produce sound patterns and to associate them with emotions and other aspects of experience." The activities in this course are designed to help students discover their own sense of musicality, becoming active participants in the processes of apreciating and creating music.

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Special thanks go to Norman Lederman for his innovative designs using instructional materials and suggestions on their use; to Suzanne Manzi and Venita Gragg for their suggested classroom activities; and to Nancy Fones for format revisions and other assistance.

COURSE OUTLINE

A. Music as Communication:
What is music?
How is music used for communication and expression?

B. Sound and Music:
Physical characteristics of sound (frequency, intensity, time, spectrum).
Physical characteristics of sound translated into musical concepts (pitch, loudness, rhythm, timbre).

C. Music Notation:
Notes indicating pitches placed on the grand staff.
Notation denoting rhythm (measures, time, signatures, note value, rests).
Markings for dynamics and style.

D. Individual and Group Instrument Instruction:
Using the notation system with a given instrument.
Developing skills on an instrument.

E. Composition:
Conceptualization of a musical piece as a method of self expression.
Form—overall plan, elements of design, and repetition.
Group development and modification.

F. Performance.

LEARNING TO LISTEN

Listening is not a purely auditory skill; it also involves physical and psychological aspects of concentration and awareness. Increased exposure to sound and music may help students be more actively involved in their environment. Awareness and memory of the parameters of sound and music are necessary skills for the development of speech and oral language. Although it is not a specific goal of this course, music can be a vehicle for improvement of interpersonal communication.

Through learning about and listening to music, students can gain new social and cultural awareness. Musical themes reflect and comment on history, time, space, and human relationships. Students can explore the beliefs, feelings, and values of others through music, and that experience can help individual students understand and express their own values and emotions. Many adolescents, including those who are hearing impaired, find role models in contemporary music figures. Such positive identification should be encouraged and promoted.

WORKING WITH MUSIC

The teaching of basic musical notation is included in this course for several reasons. Learning a notation system brings concrete visual components to the abstract concepts of sound and music. Auditory parameters are clarified, for example, by learning how notes on a staff represent pitches, or by discovering the time values of notes in a rhythm pattern. Many students derive tremendous satisfaction and a sense of accomplishment in learning a new and different visual representation system. Notation can be taught as a separate unit or as part of the instruction for playing individual instruments.

Lessons in playing a musical instrument can be provided in a variety of ways, depending on the resources available and the interests and abilities of the students. A course can be taught by one teacher using volunteers or consultants from the community, or by a team of school personnel with interest and expertise in the areas of sound and music.

A variety of instruments should be available for students to use as they compose and perform music throughout the course. Expressing thought and emotion via musical themes can be a powerful experience, helping students get involved in the class and motivated to contribute their ideas, feelings, and skills. Group composition and performance give students the opportunity to assume responsibility as members of a team. Student direction, with the teacher

acting as a guide, allows each member of the class to assume a variety of roles and responsibilities.

A warm and flexible atmosphere is essential to student success. Learning new skills usually requires a supportive environment that provides encouragement, experimentation, and practice. The course emphasizes development of individual skills and group participation, encouraging students to contribute a wide variety of auditory and musical abilities and experiences.

BUILDING AUDITORY SKILLS

Initially, each student's auditory functioning should be assessed, including use of residual hearing, listening skills, and attitudes toward use of audition. Many profoundly deaf students can identify various musical elements through audition skills alone. Student awareness of musical concepts is developed through listening to recorded music, practice on individual instruments, and practice in playing instruments in a group.

Specific listening activities, including opportunities for listening to recorded music, should be incorporated into classwork throughout the course. Students can learn to listen for their own enjoyment—using visual and tactical aids—or for more specitic purposes. Many students will be able to identify various instruments, voices, and types of music.

Where practical, students should be encouraged to use personal hearing aids. Music can help motivate young people to use aids that they have previously abandoned. Students who do not own aids might borrow them for use in class. If it is available, a group amplification system with headphones can be used.

The following checklist is designed to help teachers and students set goal for listening. Goals should be tailored to the individual needs and capabilities of each student. Students obviously will be aware of the variety of auditory and musical experiences and abilities in the class, but comparisons can be harmful unless they are used by the teacher to develop a sense of mutual helping and motivation. During listening activities, each student should feel that the individual task is important, whether it involves comprehending the lyrics to a musical piece through audition, or discriminating a rhythm pattern through tactual or visual aids. Teachers should strive to create an atmosphere in which students can speak freely and honestly about what they experience.

Some observable or reportable behaviors may include:

- Student uses a personal hearing aid.
- Aid is kept in good working order.
- Student listens to and enjoys music.
- Student owns a sound system and recordings.
- Student has experience in playing a musical instrument.
- Student can identify favorite types of music.
- In recorded music, student can identify:
  Drums or other percussion instruments.
  Solo instruments.
  Similar instruments in a unison group.
  Different instruments being played together.
  Voices—men's, women's, solo, choral.
  Lyrics.
  Genres of music.

INSTRUCTIONAL AIDS

The primary goal of this course is to make sound and music accessible to hearing impaired students. Students become acquainted with the physical aspects of sound and sound production, and learn how these principles form the foundation for creating music.

For students who may experience difficulty discriminating some parameters of sound or music, a variety of instructional aids can be used. Those aids include basic sound sources, visual and tactual analogs, and modifications in existing equipment. Aids are designed to provide maximum sensory input, helping students understand the concepts of sound and music.

Good Vibrations

If possible, sound should be presented through a high quality amplification system, suitable for playing records or tapes and for connecting musical instruments. Students need strong acoustic signals to ensure maximum transferral of information.

Sound systems can be adapted to present acoustic information through visual or tactual modes. The front grill of most loudspeakers can be removed to expose the vibrating components. These parts may be touched gently as they reproduce sound, letting students feel the impact of vibrations. Transducer devices, affixed to wooden boards, are also available. The board is held on the lap, allowing the student to feel the vibrations transmitted through the transducer.

A "vibrating floor" can be created by placing one or more loudspeakers face down on a wooden floor or platform. A vibrating floor uses the acoustical and mechanical energy that usually is projected through the air, and provides an effective way to present concepts of sound and music.

The Model Secondary School for the Deaf has a vibrating floor, built

from scrap materials. It consists of a hexagonal wooden platform eight feet in diameter, upholstered with soft carpeting. It is raised above the room's tile floor on soft fiberglass blocks. A large loudspeaker is centered face down on the platform. Six to eight students can sit directly and comfortably on the platform.

Let's Get Visual

Many techniques can be used to make sound and music "visible." Students may be asked to look at various sound sources for information about their distinctive characteristics. For example, the vibrating string on a guitar or the size of a tuning fork may give visual information about sound frequency.

The color organ is a device that accepts audio signals and displays differently colored lights, depending on the sound frequencies: red for low frequencies, yellow for middle-low frequencies, green for middle-high frequencies, and blue to indicate high frequencies. The relative brightness of each series of lights will vary according to the intensity of the sound.

Color organs range in cost and complexity from small, 15-inch square, self contained boxes with lights, circuitry, and microphones to multi-channel control boxes for custom designed lighting systems. Color organs can distinguish among sounds and display them to various degrees. The simplest are limited to conveying time and relative intensity in a somewhat random pattern. Other multi-channel selective systems may clearly distinguish, for example, between the sound of a hi-hat cymbal and the low frequencies of a bass guitar.

An oscilloscope is a versatile instrument that can display sound as patterns or forms on its screen. The patterns range from the smooth sinusoidal curve generated by a tuning fork to the complex shape of the human voice. Simpler patterns clearly show relative frequency in the number of hills and valleys. Higher frequency sounds, being made up of faster vibrations, show more peaks.

The pure tones of tuning forks will show clear differences in frequency on the oscilloscope. Relative frequency information is more difficult to ascertain with such complex signals as a male voice as compared to a female voice.

The spectrum/timbre characteristics of sound also can be seen with an oscilloscope. A tuning fork produces a sine wave because its sound has only one frequency. As the sound becomes more complex, the pattern on the oscilloscope becomes correspondingly complex and jagged, less symmetrical. The most involved patterns demonstrate the additional frequencies that are contained in a complex sound.

A real-time spectrum analyzer (RTA) performs a sound task that is somewhat analogous to a prism breaking white light into its individual color components. The RTA breaks sound into its individual color components that represent the different frequencies. Those frequency components are called harmonics or overtones, and are displayed as vertical bars or lines on the calibrated RTA screen. The accuracy of the analysis is directly related to the RTA's cost and complexity.

Until recently, the simplest RTAs were too expensive for most schools. Because of the growing sophistication of the consumer sound system market, low cost, easy-to-use RTAs are now available. They are valuable instructional tools for teaching the properties of sound and music. Low-cost RTAs can clearly display differences in high- and low-frequency tuning forks, whistles, and other sounds that are not complex in nature. Simple RTAs may not have sufficient resolution to differentiate among many complex sounds—vibrating strings or human voices—but they can demonstrate such general features of speech as fricatives and vowels.

Catching the Sound

Various acoustic sources of sound can be incorporated into hands-on classroom demonstrations, including water-filled glass bottles, drums and other musical instruments, and tuning forks. Teachers

can employ a wide selection of sound sources, varying in intensity, frequency, and spectrum.

A pure electronic sound source (sine wave oscillator or signal generator) is very helpful for displaying an extremely wide range of sounds and for detailing exact measurements of frequency. This can be helpful in teaching concepts of frequency (Hertz) and pitch, and for demonstrating hearing measurements (audiograms, audiometers). Oscillators or signal generators range in complexity and cost from small battery operated devices to units that feature exact digital displays of frequency.

Keeping the Beat

Other available electronic sound and light sources can display characteristics of time and rhythm. Two of these are the electronic metronome and the drum machine or "rhythm box." Metronomes are generally used as basic counting or timekeeping devices. Rhythms boxes are more versatile, generating a wide variety of synthesized drum patterns. The units are very small and allow control of all parameters of the sound. In addition to offering a wide range of preset rhythms, the boxes allow users to develop and enter their own rhythms, to be held in memory for later recall. Students can practice by copying patterns or creating compatible rhythms. Techniques for using the rhythm box for individual and group instrument instruction will be described in the section on musical instruments.

A variety of low cost, electronic, visual tuning aids is also available. One kind will indicate, for example, if a guitar is properly tuned. More expensive systems allow for a wide range of tuning for many kinds of instruments. It should be remembered that the simpler tuning aids will accept a guitar string, for instance, that is exactly one octave out of tune. It is recommended, therefore, that the instructor supervise student use of visual tuning devices.

The major objective for incorporating visual and tactical aids into

this program is to build student interest and excitment. The attractiveness of these aids provides incentives to learn the principles behind the displays. For that reason, a creative approach should be taken in putting together displays of light, vibrating floors, and other learning environments. Light displays can be arranged in interesting patterns, enclosed in geometric shapes by light-diffusing materials. The school's art and industrial arts departments may be helpful in creating displays that will make learning about sound and music a rewarding experience and a source of lifelong enjoyment for your students.

LEARNING OBJECTIVES FOR THE CLASSROOM

Objective 1: Identify ways to use music as a form of communication and expression.

Introduction

Define music as communication.

Instruction Activities

Show videotape titled "Music is . . ."

Plan a discussion based on the videotape:

- Music is sound that is organized or planned.
- Music has been passed down through generations for use in ceremonies, for worship, for enter tainment.
- Beethoven was a great composer who expressed his ideas and emotions through music.

Practice Activities

Have students listen to two different musical pieces, then discuss how each piece made them feel.*

Evaluation

Discuss the following questions:

- What motivates people to express their ideas through music?
- Why would people choose to express themselves that way?
- What kinds of thoughts or feelings can be expressed through music?

Teaching Tips/Resources

*Visual or tactile aids can be used for listening activities.

Objective 2: Identify basic elements of sound and sound production.

Introduction

Define sound and its basic elements, giving examples of frequency, intensity, time, and spectrum.

Demonstrate and discuss the differences between frequency, intensity, time, and spectrum.

Instruction Activities

Help students recognize that sound is vibration, using examples of frequency, intensity, time, and spectrum.

Practice Activities

Observe the production of different kinds of sounds. Categorize the changes in each sound element, i.e., high vs low frequency.

Evaluation

Students should be able to:

- Define sound as vibration.
- Demonstrate the differences between frequency, intensity, time, and spectrum.
- Create a sound and predict its frequency, intensity, time, and spectrum.

Teaching Tips/Resources

See the methods of demonstrating the production of sound in *Science of Sound*, Teacher Guide, Unit 1., published by Outreach, Gallaudet Pre-College Programs, 1984.

Objective 3: Describe the process of translating sound elements into musical elements of pitch, loudness, rhythm, and timbre.

Introduction

Match the characteristics of sound with basic elements of music: Frequency/pitch, intensity/loudness, time/rhythm, and spectrum/timbre.

Instruction Activities

Discuss the music elements of pitch, loudness, rhythm, and timbre.

Show the videotape, "Musicals . . . Rhythm."

Using the videotape emphasize that rhythm means a regular pattern of strong and weak beats.

Practice Activities

Listen to different patterns of pitch, loudness, rhythm, and timbre. Learn their similarities and differences and how to distinguish among them.

Listen, then duplicate patterns of pitch, loudness, rhythm, and timbre on a musical instrument.

Evaluation

Students should be able to:

- Define pitch, loudness, rhythm, and timbre.
- Discriminate among patterns of pitch, loudness, rhythm, and timbre.
- Create patterns of pitch, loudness, rhythm, and timbre for others to recognize or imitate.

Teaching Tips/Resources

See page xx for examples of listening activities.

Objective 4: Read basic musical notation, including all notes on the grand staff, rhythm markings, dynamic markings, etc.

Introduction

Observe a musician playing an instrument using a visual representational system (musical notation).

Instruction Activities

Identify several notes on the grand staff as representing various pitches.

Recognize the musical symbols for clef, time signature, measure, and others.

Identify basic rhythm notation—whole, half, and quarter notes and rests.

Practice Activities

Draw the letter names of notes on the grand staff.

Given a staff, draw in a time signature, measures, and notes according to the rhythm note value.

Evaluation

Complete a paper-and-pencil test of musical notation.

Teaching Tips/Resources

Commercially produced texts and booklets, available at local music stores, can be used to teach music notation.

Objective 5: Play a simple musical composition on an instrument, reading it from musical notation.

Introduction

Given a specific musical instrument, identify specific notes by letter names.

Instruction Activities

Observe techniques of playing a given instrument.

Imitate and learn those techniques for an instrument of your choice.

Practice Activities

Play a composition on a musical instrument of your choice, using notation.

Evaluation

Evaluation occurs with practice. Students can assess their own proficiency with instruments of their choice with the teacher's help, considering such criteria as fingering style and accurate reading of musical notation.

Teaching Tips/Resources

Amplified instruments such as electric guitars, bass guitars, autoharps, organs, or pianos should be made available to students.

A rhythm box sent through a vibrating floor or used with a color organ will help students follow basic rhythm patterns on their chosen instruments.

Work toward teaching the class to play together as a group. For example, if guitar students are learning a particular rhythm pattern or chord, piano students can do similar work.

Students playing different instruments can be brought together as soon as they have achieved minimum proficiency.

Objective 6: Contribute to creating a class musical composition.

Introduction

Identify the steps to conceptualizing and composing music.

Instruction Activities

View the videotape titled "Music is Composed."

Based on information in the videotape, recognize and discuss the following:

- Composers have ideas and feelings that they want to express.
- Composers take their ideas and transform them into music.
- A composer may experiment and change the music before finalizing the composition on paper.
- Identify the sound pattern and form of a simple musical piece.

Practice Activities

Listen to and identify the sound pattern and form of a simple musical piece.

Create a musical composition that includes the instruments used in the group.

Evaluation

Work on the class musical composition until you reach consensus that it is complete and acceptable.

Students can make recommendations to improve each others' work.

Teaching Tips/Resources

Objective 7: Participate in performing the class musical composition.

Introduction

Show selected videotapes of professional and nonprofessional musical performances.

Instruction Activities

Discuss the details of performance: practice schedules, staging, costuming, and other aspects.

Create a communication system within the group to indicate when individual players or the whole group should start, continue to play, and stop.

Practice Activities

Practice the musical composition, working with individual students and with the group as a whole.

Evaluation

The class should evaluate a videotape of their performance, using such criteria as keeping tempo, starting simultaneously, and coordinating their parts.

Teaching Tips/Resources

"Motown"—captioned videotape, NCI.

Gallaudet Signed Songs.

The activities in this chapter, and similar classroom projects invented by teachers or students, can be used to help the class focus on such specific attributes of sound as rhythm, pitch, and timbre.

Rhythm Exercises

The following activities are designed to build students' awareness of rhythm patterns. Each member of the class should have a percussion instrument to use for these exercises.

a. *Follow the Leader*
The teacher starts a simple rhythm pattern, using strong and weak beats. Each student in turn tries to duplicate the teacher's pattern. Repeat until every student gets it right, then play the pattern in unison. Repeat the exercise with additional rhythm patterns of increasing complexity.

b. *Taking Turns*
The students and the teacher sit in a circle. One student creates a simple rhythm pattern. Using audition only, the next student in the circle repeats the pattern, and so on around the circle. When everyone in the circle has recreated the first pattern accurately, the next student starts a new pattern. Continue until each student has had at least one chance to initiate a rhythm pattern.

c. Counterpoint
Divide students into two groups. One group will develop and play a simple rhythm pattern. Then the second group must create a pattern that is compatible with the first. Play the two patterns together and enjoy the more complicated rhythms. Groups take turns starting new patterns.

Pitch Exercise

Use a piano for this activity, to help students increase their awareness of musical pitch.

One student plays a hi-lo pattern on the piano, using three to five

different notes in a specific range. A second student listens to the pattern and tries to duplicate it. The first student who can copy the first pattern accurately creates a new pattern for the rest of the students to repeat. Continue until everyone has at least one chance to create a tune.

Timbre Exercise

This exercise uses a variety of different instruments to help students become familiar with differences in sound quality.

The class is given a variety of instruments and plenty of time to pass them around, manipulate them and play notes on them. After the students have become familiar with the different sounds, the teacher collects the instruments.

At the back of the room, or with students' eyes closed, play a few notes on one instrument and let students guess which one was played, using audition only. Repeat with the rest of the instruments. Then let each student play an instrument while other students try to guess.

EQUIPMENT SOURCES

Color Organs and Lighting Equipment:

Edmund Scientific Company
101 East Gloucester Pike
Barrington, NJ 08007

Music Systems, Color Organs, and Sound Level Meters:
Radio Shack Company
Check your telephone directory for the nearest outlet.

Musical Instruments and Supplies:
Rhythm Bank, Inc.
PO Box 126
Forth Worth, TX 76101

Gamble Music Company
312 South Wabash Avenue
Chicago, IL 60604

Rhythm Boxes, Turners, and Suppliers:
Veneman Music Company
1150 Rockville Pike
Rockville, MD 20852

Vibration Transducers:
Scientific Innovators
210 Newberry Street, SW
Aiken, SC 29801

Real-time Spectrum Analyzers (low cost):
BSR/ADC Ltd.
Route 303
Blauvelt, NY 10913

Tuning Forks, Oscilloscopes, and a variety of equipment for sound demonstrations:

Central Scientific Company
11222 Melrose Avenue
Franklin Park
Chicago, IL 60131

Frey Scientific Company
905 Hickory Lane
Mansfield, OH 44905

Fisher Scientific Company
4901 W. Lemoyne Street
Chicago, IL 60651

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